

so as to superadd to the other E.M.Fs. in operation that due to the mutual neutralisation of the acid and alkali.

Palladium behaves precisely as gold, 52 parts of metal being dissolved per 108 of silver deposited; local action sometimes causes in each case *excess* of amount dissolved relatively to the current passing, the opposite result to that observed with the silver cells above described.

Of course, if more powerful oxidising agents are used than simple aeration plates (such as platinum in sulphuric-chromic solution), the action goes on in all such cases still more rapidly; thus, for example, we did not succeed in dissolving gold in dilute hydrochloric alone by the use of an aeration plate simply; but on replacing this by a platinum plate immersed in sulphuric-chromic liquor connected by a siphon with the dilute hydrochloric acid in which the gold was immersed, chlorination of the gold was readily effected with the formation in the first instance of *aurous chloride*, which rapidly broke up into particles of spongy gold and auric chloride in solution.

II. "The Early Development of the Pericardium, Diaphragm, and Great Veins." By C. B. LOCKWOOD, F.R.C.S., Huxterian Professor of Anatomy in the Royal College of Surgeons of England. Communicated by G. M. HUMPHRY, F.R.S.
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(Abstract.)

The history of the development of the pericardium, diaphragm, and great veins is traced by means of rabbit's embryos ranging from the eighth to the seventeenth day of intrauterine life.

The splanchnic origin of the two halves of the heart is briefly illustrated, and each separate half is shown to project into the foremost end of the cœlom. The approximation of the halves of the heart, and of the cœlom in which they are contained, and the formation of the mesocardium posterius and anterieus, is next narrated. The course of the omphalomesenteric veins to the heart along the splanchnic wall of the cœlom is then traced, and those vessels are shown to divide the cœlom into two parts, a "cardiac" and a "pleuro-peritoneal." At the beginning of the ninth day the cœlom consists of two halves which are some distance apart towards the tail end, but converge towards the head to open behind the omphalomesenteric veins, into the cardiac portions of the cœlom. To adopt a rough comparison, the cœlom is, at the beginning of the ninth day, not unlike a pair of trousers; the cardiac portion would correspond to that part of the trousers which receives the pelvis, whilst the hinder parts of the cœlom would correspond to the places for the legs. To

carry the simile a step further, it might be said that the omphalomesenteric veins would run round the front of the trousers opposite the bend of the groins.

An adhesion of the omphalomesenteric veins to the somatopleure, at the level of the hinder end of the heart, is next described, and identified with the mesocardium laterale, and is shown to be the way by which the umbilical veins find a passage to the heart. Those vessels develop in the somatopleure, and are by means of it brought in relation with the endometrium in a manner which is described. The portions of the omphalomesenteric veins which cross the ventral splanchnic boundary of the *cœlom* are held by the mesocardium posterius, and by the mesocardium laterale, close to the dorsal wall of the *cœlom*, and, in consequence, as the cardiac and pleuro-peritoneal portions of the *cœlom* expand, the part bounded by the omphalomesenteric veins remains stationary and narrow. This narrow part of the *cœlom* is named the "*iter venosum*," because the great veins have so much to do with its formation, and, subsequently, with its closure.

The development of a septum, the septum transversum, between the cardiac and pleuro-peritoneal portions of the *cœlom*, is attributed to the fixation of the omphalomesenteric veins. When, in due course, the heart expands and is carried tailwards by the cranial flexure and its own growth, those vessels continue to hold the ventral splanchnic wall of the *cœlom* close against the dorsal wall, and in consequence it becomes retroflected behind the heart. This retroflected portion stretches from one mesocardium laterale to the other, across the axis of the embryo; its front surface is in contact with the heart, and its hinder surface is covered with hypoblast in which the liver originates; thus a ventral diaphragm is formed between the liver and the heart.

The appearance of other somatic veins, namely, of the anterior cardinals and afterwards of the posterior cardinals, is noted. The former develop first and empty into the umbilical veins just as they (the umbilical veins) open into the omphalomesenteric; when the posterior cardinal veins appear they join the anterior cardinals, so that a portion of each of the latter nearest the heart becomes the Cuvierian duct.

Until the middle of the ninth day the embryo lies with its back to the uterus. The way in which it turns its right side and afterwards its venter towards the uterus is described, and also the infolding of the somatopleure and splanchnopleure, and its effect upon the relations of the great veins and septum transversum.

The commencement of the umbilical veins and early formation of the placenta are next illustrated. The allantois of the rabbit is shown to be exceedingly rudimentary, and to take no part in the formation

of the placenta, which is developed in connexion with somatic structures.

The further development of the ducts of Cuvier is then explained, and those vessels are shown to end, as did the jugulars from which they are formed, by opening into the mouths of the umbilical veins quite close to the heart. In the next stage of development, owing to the expansion of the heart, the omphalomesenteric veins, umbilical veins, and Cuvierian ducts, acquire separate openings into the heart, and at the same time the right and left umbilical veins, just before entering the heart, communicate with the venous spaces of the liver, and have through them an alternative route to the heart. Whilst these changes are in progress, the left omphalomesenteric vein, where it is related to the liver, becomes occluded with liver substance. The gradual conversion of the mesocardium laterale and septum transversum into a dorsal pericardium and ventral diaphragm is then described, and afterwards the closure of the iter venosum by the apposition of the Cuvierian ducts and the sides of the trachea and œsophagus; whilst this is in progress the subclavian veins appear and empty themselves into the Cuvierian ducts, which in this way become the right and left superior venæ cavæ.

During the twelfth day the umbilical veins lose their direct opening into the heart, and the left vein, taking advantage of the alternative route through the liver, passes through the substance of that organ to end in the right omphalomesenteric vein close to the heart. The channel which unites the left umbilical vein to the right omphalomesenteric vein is the ductus venosus Arantii. When the permanent kidneys and hind limbs develop, a vein passes from them into the cardiac end of the right omphalomesenteric vein, so that it becomes the terminal end of the inferior vena cava.

Whilst these changes are in progress numerous mesenteric veins develop, and open into the hinder portion of the right omphalomesenteric, which then becomes the portal vein, and at first empties into the sinus venosus Arantii. The hepatic portion of the left omphalomesenteric vein is quite obliterated, and that vessel ceases to enter the heart; however, its hinder part may persist and carry blood from the mesentery into the portal vein, with which it acquires communications.

About the middle of the twelfth day, and when the iter venosum is upon the point of closure, the dorsal diaphragm develops as a crescentic fold projecting from the side body-wall close to the superior venæ cavæ, and uniting the dorsal pericardium to the dorsal body-wall. As the thorax develops this dorsal diaphragm travels further tailwards, its hindermost dorsal attachments being united to the fore-end of the urogenital ridge, and its ventral attachments with the dorsal part of the liver and the mesoblast which covers it.

The growth and development of the dorsal diaphragm is traced until, upon the thirteenth day, it unites with the dorsal mesentery, and forms a complete partition between the thorax and abdomen. Finally, the development of the crura and other muscular portions of the diaphragm is mentioned.

- III. "An Investigation into the Function of the Occipital and Temporal Lobes of the Monkey's Brain." By SANGER BROWN, M.D., and E. A. SCHÄFER, F.R.S., Jodrell Professor of Physiology in University College, London. Received November 24, 1887.

(Abstract.)

This paper contains a record of a series of experiments on the brain of monkeys, which consisted in the establishment of definite lesions of the occipital and temporal lobes, and the observation of the results of such lesions. Drawings showing exactly the extent of the lesion in each case accompany the paper.

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Transactions.

- Calcutta :—Asiatic Society of Bengal. Journal. Vol. LIV. Part 2. No. 4. Vol. LV. Part 2. No. 5. Vol. LVI. Part 2. No. 1. 8vo. *Calcutta* 1887; Proceedings. 1887. Nos. 6-8. 8vo. *Calcutta*. The Society.
- Cambridge :—Philosophical Society. Proceedings. Vol. VI. Part 2. 8vo. *Cambridge* 1887. The Society.
- Devonshire :—Devonshire Association. Report and Transactions. Vol. XIX. 8vo. *Plymouth* 1887; The Devonshire Domesday. Part 4. 8vo. *Plymouth* 1887. The Association.
- Glasgow :—Philosophical Society. Proceedings. Vol. XVIII. 8vo. *Glasgow* 1887. The Society.
- Heidelberg :—Naturhistorisch-Medicinischer Verein. Verhandlungen. Band IV. Heft 1. 8vo. *Heidelberg* 1887. The Verein.
- Leipzig :—Astronomische Gesellschaft. Vierteljahrsschrift. Jahrg. XXII. Hefte 2-3. 8vo. *Leipzig* 1887. The Society.
- Fürstlich-Jablonowski'sche Gesellschaft. Jahresbericht. 1887. 8vo. *Leipzig*. The Society.
- Königl. Sächs. Gesellschaft der Wissenschaften. Abhandlungen (Math.-Phys. Classe). Band XIII. Nos. 8-9. Band XIV.